

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A scanning optical system condensing a beam deflected by an optical deflector so as to form a beam spot on a surface to be scanned, comprising two lenses, wherein:

a lens on the side of optical deflector thereof has a negative refracting power in sub-scanning direction;

a lens on the side of surface to be scanned thereof has a positive refracting power in the sub-scanning direction; and

at least one lens surface of the lens surfaces of said two lenses is such that a shape in a sub-scanning section thereof is a non-arc shape, and said at least one lens surface has a non-coaxial surface, wherein:

two lens surfaces such that a curvature in a sub-scanning section varies in main scanning direction are formed in different lenses;

at least one surface of said at least two lens surfaces is such that change in the main scanning direction of a curvature in a sub-scanning section thereof is asymmetrical; and

said optical system is such that a lateral magnification β_2 in the sub-scanning direction at a central height and a lateral magnification β_h in the sub-scanning direction at any image height satisfy the following condition (2)

$$(2) \quad 0.93 < |\beta_h / \beta_2| < 1.07.$$

Claim 2 (Original): The scanning optical system as claimed in claim 1, wherein the surface such that a shape in a sub-scanning section thereof is a non-arc shape is a sub-non-arc surface such that the non-arc shape changes according to the position in main scanning direction of the sub-scanning section.

Claim 3 (Original): The scanning optical system as claimed in claim 1, wherein said lens on the side of optical deflector has a positive refracting power in main scanning direction.

Claim 4 (Original): The scanning optical system as claimed in claim 1, wherein a lateral magnification β_2 in the sub-scanning direction at a central image height of said optical system satisfies the following condition (1):

$$(1) \quad 0.5 \leq |\beta_2| \leq 2.0$$

Claim 5 (Original): The scanning optical system as claimed in claim 2, wherein a shape of the sub-non-arc surface in a main scanning section is a non-arc shape.

Claim 6 (Original): The scanning optical system as claimed in claim 1, wherein said optical system comprises an anamorphic optical system having a function of making a position on or the proximity of a deflection reflective surface of the optical deflector and a position on the surface to be scanned have a geometric-optical conjugate relationship with regard to the sub-scanning direction.

Claim 7 (Original): The scanning optical system as claimed in claim 6, wherein, in each of all the four lens surfaces of said two lenses, curvatures in the main and sub scanning directions are different from one another.

Claim 8 (Original): The scanning optical system as claimed in claim 1, wherein said optical system has an imaging capability such that, when a spot diameter of a beam spot on

the surface to be scanned is defined by $1 / e^2$ intensity in line spread function of light intensity distribution of the beam spot, the spot diameter in each of the main and sub-scanning directions is equal to or smaller than $50 \mu\text{m}$ in an effective writing width.

Claim 9 (Original): The scanning optical system as claimed in claim 2, wherein a non-arc amount which is an amount of difference of the non-arc shape in a sub-scanning section of the sub-non-arc surface from an arc changes asymmetrically in the main scanning direction.

Claim 10 (Canceled).

Claim 11 (Original): The scanning optical system as claimed in claim 1, wherein an effective writing width W and a width Fs of sub-scanning curvature of field in the effective writing width satisfy the following condition (3):

$$(3) \quad Fs / W < 0.005$$

Claim 12 (Currently Amended): The scanning optical system as claimed in claim 1, wherein said two lenses has have at least two lens surfaces each of which is such that change in the main scanning direction of a curvature in a sub-scanning section is asymmetrical, and at least two lens surfaces of said at least two lens surfaces have an air separation therebetween.

Claim 13 (Currently Amended): The scanning optical system as claimed in claim 11, wherein said two lenses has have at least two lens surfaces each of which is such that change in main scanning direction of a curvature in a sub-scanning section is asymmetrical, and at least two lens surfaces of said at least two lens surfaces have an air separation therebetween.

Claim 14 (Original): The scanning optical system as claimed in claim 1, wherein said optical system is used for condensing a plurality of beams simultaneously deflected so as to form a plurality of beam spots on the surface to be scanned.

Claim 15 (Currently Amended): An optical scanning device in a single-beam system comprising:

a coupling lens coupling a beam from a light source to ~~a subsequent optical system by a coupling lens; a line-image forming optical system~~ forming of the coupled beam in a line image long in a main scanning direction on or in the proximity of a deflection reflective surface of an optical deflector ~~by a line-image forming optical system, the optical deflector~~ deflecting the beam at a uniform angular velocity ~~by said optical deflector;~~

a scanning optical system condensing the deflected beam so as to form a beam spot thereof on a surface to be scanned ~~by a scanning optical system~~, and scanning said surface to be scanned,

said scanning optical system comprising ~~the scanning optical system claimed in claim 1 two lenses, wherein:~~

a lens on the side of optical deflector thereof has a negative refracting power in sub-scanning direction;

a lens on the side of surface to be scanned thereof has a positive refracting power in the sub-scanning direction;

at least one lens surface of the lens surfaces of said two lenses is such that a shape in a sub-scanning section thereof is a non-arc shape, and said at least one lens surface has a non-coaxial surface, wherein:

two lens surfaces such that a curvature in a sub-scanning section varies in main scanning direction are formed in different lenses;

at least one surface of said at least two lens surfaces is such that change in the main scanning direction of a curvature in a sub-scanning section thereof is asymmetrical; and
said optical system is such that a lateral magnification β_2 in the sub-scanning direction at a central height and a lateral magnification β_h in the sub-scanning direction at any image height satisfy the following condition (2)

$$(2) \quad 0.93 < |\beta_h / \beta_2| < 1.07.$$

Claim 16 (Currently Amended): An optical scanning device in a multi-beam system comprising:

a coupling lens coupling beams from a plurality of light-emitting sources to a ~~subsequent optical system by a coupling lens~~, common line-image forming optical system forming of the plurality of coupled beams in a plurality of line images long in a main scanning direction and separate in a sub-scanning direction on or in the proximity of a deflection reflective surface of an optical deflector ~~by a common line-image forming optical system, the optical deflector simultaneously deflecting the beams at a uniform angular velocity by said optical deflector;~~

a common scanning optical system condensing the respective deflected beams so as to form thereof a plurality of beam spots separate in the sub-scanning direction on a surface to be scanned ~~by a common scanning optical system~~, and scanning said surface to be scanned by the plurality of beam spots so as to draw a plurality of scan lines simultaneously thereon,

said common scanning optical system comprising ~~the scanning optical system claimed in claim 14 two lenses, wherein:~~

a lens on the side of optical deflector thereof has a negative refracting power in sub-scanning direction;

a lens on the side of surface to be scanned thereof has a positive refracting power in the sub-scanning direction;

at least one lens surface of the lens surfaces of said two lenses is such that a shape in a sub-scanning section thereof is a non-arc shape, and said at least one lens surface has a non-coaxial surface, wherein:

two lens surfaces such that a curvature in a sub-scanning section varies in main scanning direction are formed in different lenses;

at least one surface of said at least two lens surfaces is such that change in the main scanning direction of a curvature in a sub-scanning section thereof is asymmetrical; and

said optical system is such that a lateral magnification β_2 in the sub-scanning direction at a central height and a lateral magnification β_h in the sub-scanning direction at any image height satisfy the following condition (2)

$$(2) \quad 0.93 < |\beta_h / \beta_2| < 1.07, \text{ and}$$

said optical system is used for condensing a plurality of beams simultaneously deflected so as to form a plurality-of beam spots on the surface to be scanned.

Claim 17 (Original): The optical scanning device as claimed in claim 16, wherein said plurality of light-emitting sources comprise a monolithic semiconductor laser array in which the plurality of light-emitting sources are arranged so as to form a line.

Claim 18 (Original): The optical scanning device as claimed in claim 17, wherein each of the intervals of the light-emitting sources of said semiconductor laser array is equal to or larger than 10 μm .

Claim 19 (Currently Amended): An image forming apparatus ~~forming a latent image~~
comprising:

a photosensitive surface of a photosensitive medium on which a latent image is formed by scanning thereof by an optical scanning device, and visualizing the latent image so as to obtain an image,

said optical scanning device comprising ~~the optical scanning device as claimed in claim 15;~~

a coupling lens coupling a beam from a light source to a line-image forming optical system forming the coupled beam in a line image long in a main scanning direction on or in the proximity of a deflection reflective surface of an optical deflector, the optical deflector deflecting the beam at a uniform angular velocity;

a scanning optical system condensing the deflected beam so as to form a beam spot thereof on a surface to be scanned, and scanning said surface to be scanned,

said scanning optical system comprising two lenses, wherein:

a lens on the side of optical deflector thereof has a negative refracting power in sub-scanning direction;

a lens on the side of surface to be scanned thereof has a positive refracting power in the sub-scanning direction;

at least one lens surface of the lens surfaces of said two lenses is such that a shape in a sub-scanning section thereof is a non-arc shape, and said at least one lens surface has a non-coaxial surface, wherein:

two lens surfaces such that a curvature in a sub-scanning section varies in main scanning direction are formed in different lenses;

at least one surface of said at least two lens surfaces is such that change in the main scanning direction of a curvature in a sub-scanning section thereof is asymmetrical; and

said optical system is such that a lateral magnification β_2 in the sub-scanning direction at a central height and a lateral magnification β_h in the sub-scanning direction at any image height satisfy the following condition (2)

(2) $0.93 < |\beta_h / \beta_2| < 1.07.$

Claim 20 (Currently Amended): An image forming apparatus ~~forming a latent image on comprising:~~

a photosensitive surface of a photosensitive medium on which a latent image is formed by scanning thereof by an optical scanning device, and visualizing the latent image so as to obtain an image,

 said optical scanning device comprising ~~the optical scanning device as claimed in claim 16;~~

a coupling lens coupling beams from a plurality of light-emitting sources to a common line-image forming optical system forming the plurality of coupled beams in a plurality of line images long in a main scanning direction and separate in a sub-scanning direction on or in the proximity of a deflection reflective surface of an optical deflector, the optical deflector simultaneously deflecting the beams at a uniform angular velocity;

a common scanning optical system condensing the respective deflected beams so as to form thereof a plurality of beam spots separate in the sub-scanning direction on a surface to be scanned, and scanning said surface to be scanned by the plurality of beam spots so as to draw a plurality of scan lines simultaneously thereon,

said common scanning optical system comprising two lenses, wherein:

a lens on the side of optical deflector thereof has a negative refracting power in sub-scanning direction;

a lens on the side of surface to be scanned thereof has a positive refracting power in the sub-scanning direction;

at least one lens surface of the lens surfaces of said two lenses is such that a shape in a sub-scanning section thereof is a non-arc shape, and said at least one lens surface has a non-coaxial surface, wherein:

two lens surfaces such that a curvature in a sub-scanning section varies in main scanning direction are formed in different lenses;

at least one surface of said at least two lens surfaces is such that change in the main scanning direction of a curvature in a sub-scanning section thereof is asymmetrical; and

said optical system is such that a lateral magnification β_2 in the sub-scanning direction at a central height and a lateral magnification β_h in the sub-scanning direction at any image height satisfy the following condition (2)

$$(2) \quad 0.93 < |\beta_h / \beta_2| < 1.07, \text{ and}$$

said optical system is used for condensing a plurality of beams simultaneously deflected so as to form a plurality-of beam spots on the surface to be scanned.

Claim 21 (Original): The image forming apparatus as claimed in claim 19, wherein said photosensitive medium comprises a photoconductive photosensitive body, and an electrostatic latent image formed as a result of uniform charging of the photosensitive surface and scanning thereof by the optical scanning device is visualized into a toner image.

Claim 22 (Original): The image forming apparatus as claimed in claim 20, wherein said photosensitive medium comprises a photoconductive photosensitive body, and an electrostatic latent image formed as a result of uniform charging of the photosensitive surface and scanning thereof by the optical scanning device is visualized into a toner image.